

HR-185 Laboratory Study of Slurry Seal Coats

Key Words: Slurry seal coats, Asphalt emulsions, Aggregate

ABSTRACT

Extensive programmed laboratory tests involving some 400 asphalt emulsion slurry seals (AESS) were conducted. Thirteen aggregates including nine Iowa sources, a quartzite, a synthetic aggregate (Raydite), a limestone stone from Nebraska, and a Chat aggregate from Kansas were tested in combination with four emulsions and two mineral fillers, resulting in a total of 40 material combinations. A number of meetings were held with the Iowa DOT engineers and 12 state highway departments that have had successful slurry seal experiences and records, and several slurry seal contractors and material and equipment suppliers were contacted. Asphalt emulsion slurry seal development, uses, characteristics, tests, and design methods were thoroughly reviewed in conjunction with Iowa's experiences through these meetings and discussions and through a literature search. The following is the summary of findings, conclusions, and recommendations:

- Asphalt emulsion slurry seals, when properly designed and constructed, can improve the quality and extend the life of existing pavement surface, and their application can become a viable and eco-nomical pavement maintenance procedure, both preventive and corrective.
- Although asphalt emulsion slurry seals have been used in the U.S. for more than 25 years and many thousands of miles of successful asphalt emulsion slurry seals have been built both in the U.S. and abroad, their design and construction are still an art rather than a science. Experiences with the slurry seal have been mixed; consistent success in the construction and performance of the slurry seal, except in a few states, has not been achieved.
- More than 40 material, slurry, and construction variables were identified that will affect the design, construction, and performance of an asphalt emulsion slurry seal.
- The major reasons for the mixed experiences and lack of consistent success with AESS are believed to be:
 - Too many variables that will affect the properties, design, construction and performance of an AESS.
 - No standard design method and traffic and geographically-based design criteria.
 - General lack of experiences, total process control and proper equipments on the part of some contractors.